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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,278	10/15/2001	Genji Imai	011381	1088

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EXAMINER

THORNTON, YVETTE C

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 03/04/2004

*Handwritten signature*

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/976,278	<b>Applicant(s)</b> IMAI, GENJI	
	<b>Examiner</b> Yvette C. Thornton	<b>Art Unit</b> 1752	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 5-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 5-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

This is written in reference to application number 09/976278 filed on October 15, 2001 and published as US 2002/0068236 A1 on June 6, 2002.

#### *Response to Amendment*

1. Claims 2-4 have been cancelled. Claims 1 and 5-14 are currently pending.
2. The indicated allowability of claims 4-5 and 11 are withdrawn in view of the newly discovered reference(s) to Bantu et al. (US 6072006). Rejections based on the newly cited reference(s) follow.

#### *Claim Rejections - 35 USC § 103*

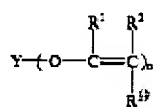
3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1 and 5-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bantu et al. (US 6,072,006) in view of Urano et al. (US 6033826 A) and Makoto et al. (JP 09-138502 A, machine translation). Bantu teaches a process for preparing an organically soluble partially cross-linked acid labile polymer. The said polymer may be blended with a photoacid generator in a solvent to formulate a chemically amplified resist composition (c. 2, l. 40-47). The general process for generating the said polymer comprises the steps of providing a polymer with one or more monomer units, wherein at least one of the said units contain one or more pendant COOH or OH groups; and reacting this polymer with a

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polyvinyl ether in the presence of an acid catalyst to form links between at least two polymer chains. In the taught invention polyvinyl ether means a compound with two or more vinyl ethers. In a further embodiment, monovinyl ether is added to the above process to form a ketal or acetal protecting groups by functionalizing the monomer units of the COOH or OH pendant groups. A monovinyl ether is defined by the taught invention as a compound with only one vinyl ether (c. 2, l. 48-63). The preferred hydroxyl based reactant polymers are phenolic or hydroxycycloalkyl-based polymer or mixtures thereof. The more preferred phenolic based polymer is polyhydroxystyrene (PHS) and novolak and the more preferred hydroxycycloalkyl-based reactant polymer is polyvinylcyclohexanol (c. 4, l. 1-14). Any suitable polyvinyl ether may be used for the taught crosslinking process. The preferred ether



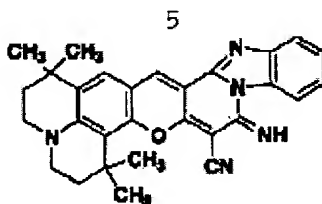
has the general formula:

(c. 4, l. 15-59). Suitable examples include cyclohexanedimethanol divinyl ether and ethylene glycol divinyl ether (c. 4, l. 60-67). See also column 5, lines 1-45. Bantu further provides a process for forming a pattern which comprises the steps of providing the chemically amplified resist composition comprising the said polymer; coating a substrate with the resist composition; soft-baking the resist; imagewise exposing the resist coated substrate to actinic radiation; and forming a resist image by developing the resist coated substrate. Bantu teaches that radiation sources, which can be used, are all sources, which emit radiation in which the photoacid generator is sensitive (c. 12, l. 60-61). It is the examiner's position that the taught polymer meets the limitations of a carboxyl containing and/or hydroxy phenyl containing resin in combination with an ether linkage containing olefinic unsaturated compound.

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5. Bantu teaches all the limitations of the claimed invention except the use of a photosensitizer and a photoacid proliferating agent. <sup>(US 6,338,264)</sup>Urano teaches that conventional additives for resist materials include phenolic compounds, UV absorbers, sensitivity adjusting agents, plasticizers, photosensitizers, organic acids, surfactants etc. (c. 22, l. 33-39).

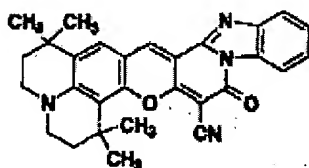
6. Makoto et al. (JP 09-138502 A, machine translation) teaches that recently in connection with the image recording technology using visible light, the need for a compound, which can be photopolymerized by light, is increasing (p. 0002). Makoto teaches a series of benzopyran ring condensation compound guided from a 3-benzimidazolyl-2-imino coumarin compounds which show photosensitization ability to light with a wavelength of 500 nm or more (p. 0008). Specific compounds include formulae 5-6, 8-10 and 15 (p. 0016-0026).



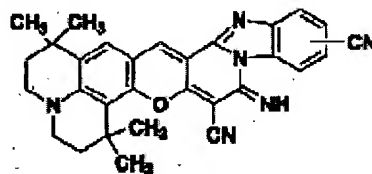
Formula 5 having the structure:

(5) meets the limitations of

claimed formula (1) when Y=NH, R1=H and R2=H. Formula 6 having the structure:



(6) meets the limitations of claimed formula (1) when Y=O, R1=H

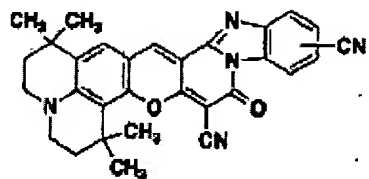


and R2=H. Formula 8 having the structure:

(8) meets the

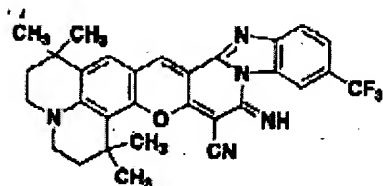
limitations of claimed formula (1) when Y=NH, R1=H and R2=CN. Formula 9 having the

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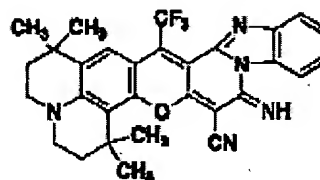


structure:

(9) meets the limitations of claimed formula (1) when

Y=O, R<sub>1</sub>=H and R<sub>2</sub>=CN. Formula 10 having the structure:

(10) meets the limitations of claimed formula (1) when Y=NH,

R<sub>1</sub>=H and R<sub>2</sub>=CF<sub>3</sub>. Formula 15 having the structure:

(15)

meets the limitations of claimed formula (1) when Y=NH, R<sub>1</sub>=CF<sub>3</sub> and R<sub>2</sub>=H.

7. One of ordinary skill in the art would have been motivated by what is well known and conventional as taught by Urano to incorporate a photosensitizer and an organic acid into the taught composition of Bantu. One of ordinary skill in the art would have been motivated by the teachings of Makoto, and the general trend in the art, to incorporate any one of the taught benzopyran ring condensed compounds of formulae 5-6, 8-10 and 15 into the composition of Bantu, as a photosensitizer, in order to make the composition suitable for exposure to visible light greater than 500 nm.

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bantu et al. (US 6,072,006) in view of Urano et al. (US 6033826) and Makoto et al. (JP 09-138502 A, machine translation) as applied to claims 1 and 5-13 above, and further in view of Imai et al.

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(US 5496678 A). Bantu in view of Urano and Makoto teach all the limitations of the claimed invention except it fails to teach peeling off the support film to form a resist pattern.

9. Imai teaches a photochemical composition, which can be used as a dry film type resist or a transfer film type. In the dry film type resist, the taught composition is coated on a transparent and flexible supporting film. The coated solution is heated to remove the solvent thereby forming a dry film. As necessary, a protective layer maybe formed on the resist side of the said film. Alternatively, it is possible that a resist film is formed on a releasable film and then a supporting film be mounted on the resist film. The adhesivity between the supporting film and the resist film is generally 1/10 or less of the adhesivity between the supporting film and the resist film. The transfer film is prepared in the same manner as the dry film resist except that the adhesivity between the supporting film and the resist film is desirably about 1/3 or less of the adhesivity between the substrate and the resist film when it has been laminated on a substrate. In the case of the transfer film type, the supporting film is peeled off before irradiation. In the case of the dry film type resist, the supporting film is peeled off from the resist film after irradiation (c. 11, l. 7-c. 12, l. 3). It would have been obvious to one of ordinary skill in the art, in light of the teachings of Imai to use the composition Bantu to make a transfer film wherein the supporting film is peeled off prior to irradiation or a dry film type resist wherein the supporting film is peel-off after irradiation.

#### *Response to Arguments*

10. Applicant's arguments, filed December 12, 2003, have been fully considered and are persuasive. The rejections set forth in the previous office action are hereby withdrawn.


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*Conclusion*

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yvette C. Thornton whose telephone number is 571-272-1336. The examiner can normally be reached on Monday-Thursday from 8:00 am to 6:30 pm.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff, can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Yvette Clarke Thornton  
Patent Examiner  
Art Unit 1752

yct  
February 24, 2004